



Electrochemical Trace Metal Analyzer





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Ideal to both the most sophisticated applications in research and routine analyses using the reference electrochemical techniques

Metal analyses are easy and economical





General description

In compliance with the current regulations (i.e. EC REGULATION n° 466/2001) on the maximum concentration level, heavy metal detection in waters, air, ground, food, oil and cosmetic fields has become fundamental for the public and environmental health.

IONIX is a high-sensitivity analysis unit able to detect metal traces in different simple or complex matrixes. High speed to measure the potential variations, with their subsequent processing, allows to reach a high detectability level (often below ppb). Thus, very small metal traces can be accurately and repeatedly detected and quantified.

Unlike other similar techniques, analyses can be run on the "ORIGINAL" sample too, that is matrixes do not require any chemical or physical pre-treatment; moreover, samples are not destroyed during analyses. This makes IONIX particularly suitable for routine analyses and for use by non-particularly skilled operators.

Spot on-site analyses can be performed thanks to its small compact size.

APPLICATION FIELDS:



ENVIRONMENT

Tap water, waste water,
sea water
Waste /compost
Air
Soils



BEVERAGES

Wine, beer, vinegar,
distillates, spirits
Other beverages



FOOD

Milk and dairy-products
Vegetable preserves
Tin containers
Oils and fats
Sugar and sweets
Fish
Feed and forage



OTHER APPLICATIONS

Cosmetics and
pharmaceutical products
Chemical products
Petrolchemistry
Urine and Blood
Galvanic industry

Heavy metals and other organic compounds detectable:

Aluminum
Antimony
Arsenic
Bismuth
Cadmium
Cobalt
Chromium
Iron
Gallium
Manganese
Mercury

Molybdenum
Nickel
Lead
Copper
Selenium
Tin
Thallium
Titanium
Uranium
Vanadium
Zinc

NOTE: Detectability limits and actual analyzability of the heavy metals and other organic compounds listed above depend on the kind of matrix and treatment conditions (e.g. mineralization, reagents purity, laboratory environmental conditions, operator's skills).

Updated techniques:

- PSA (Potentiometric Stripping Analysis)
- CCSA (Constant Current Stripping Analysis)
- DPS (Differential Pulse)
- SWS (Square Wave)
- CYU (Cyclic Voltammetry)



REMARKABLE FEATURES:

- **HIGH SENSITIVITY**
IONIX is particularly versatile for the detection of metals reaching sensitivity lower than ppb
- **QUICK ANALYSES**
IONIX gives analytical results in a few minutes
- **USER-FRIENDLY**
the whole analysis can be automatically performed by means of a personal computer and a software
- **COMPETITIVE PRICE**
IONIX has a very competitive price. Its management costs refer to only consumption of solutions
- **WIDE RANGE OF APPLICATIONS**
IONIX can be applied to food, biological and environment industries
- **ANALYTICAL SUPPORT**
our specialists provide you with technical assistance as well as best configuration and sample treatment methods to use. The main analyses methods are supported by reference scientific bibliography
- **SMALL SIZE**
its small compact size makes installation easy in very small spaces
- **COMPLEMENTARY TO TECHNIQUES such as AA pr ICP**
IONIX is a simple, fast and easy alternative when a few samples or specific metals with very low concentration levels have to be analyzed (ideal for As and Hg)





STANDARD EQUIPMENT:

- Ionix unit
- Stirrer run by a microprocessor
- Glassy carbon graphite electrode
- Ag/AgCl reference electrode
- Platinum electrode
- Wave software

Configurations with main metals:

METAL	TECHNIQUE	ELECTRODE CONFIGURATION
Antimony	DP	RDE
Arsenic	DPV	RDE
Cadmium	PSA/DP	GC /HDME
Cobalt	DP	GC / HDME
Iron	DP	HDME
Manganese	PSA/DP	GC /HDME
Mercury	SQW	RDE
Nickel	DP	GC /HDME
Lead	PSA/DP	GC /HDME
Copper	PSA/DP	GC /HDME
Selenium	CCSA/DP	GC /HDME
Zinc	PSA	GC /HDME
Vanadium	SQW	HDME
Chromium	DP/SQW	HDME

PSA: Anodic Stripping Potentiometry
CCSA: Constant Current Anodic Stripping
DP: Differential Pulse Voltammetry
SQW: Square Wave Voltammetry
RDE: Rotating Disk Electrode
HDME: Hanging Drop Mercury Electrode
GC: Glassy Carbo-Graphite electrode

EQUIPMENT AND ACCESSORIES



GLASSY CARBON GRAPHITE ELECTRODE (GC)

In order to detect the concentration of metal traces in a solution, it is possible to carry out an electrochemical technique using the reduction potential of an element (to dose traces in a solution). To detect the metal trace, the sample has to undergo a suitable treatment depending on the kind of matrix in which the element is present. Moreover, the quantity of sample to be taken depends on the metal concentration. The element to be dosed is turned into metal state by applying a well-defined negative potential. The cell where the electrochemical reaction takes place must contain a support electrolyte, thus allowing the migration of the charged species towards the graphite electrode. This electrolyte is usually made of an acid solution. The potentiometric stripping technique is very sensitive. In fact, metal traces can be detected at levels lower than ppb (often up to ppt).

NOTE: Ag/AgCl electrode (reference electrode) and Platinum Wire electrode are used to create and close the electrical circuit. They are supplied as standard.



ROTATING DISK ELECTRODE (RDE)

The new rotating disk electrode is assembled on a driving shaft (which has a steady and adjustable angular speed (ω) perpendicularly to the disk surface. As a result of this movement, the fluid near the disk produces a radial speed, thus moving it away from the middle of the disk. Then the shifted fluid is replaced with a “regular” flow on the surface. The rotating disk electrode acts as a “pump” since it sucks liquid solutions from the cell.

The rotating disk electrode provides an efficient and reproducible transfer of liquids, thus allowing for the analytical measurements to gain reproducibility and accuracy. Steroglass rotating disk electrode is placed into the conical slot of the electrode support , instead of the propeller stirrer used with other stationary electrodes.

IONIX voltammetry system connections are made possible by a small coaxial cable (standard), while external speed controller connection takes place through a multi-polar shielded cable (standard with the said controller). RDE electrode is particularly suitable when very low metal concentrations have to be reached (ppb or even ppt levels).



HANGING DROP MERCURY ELECTRODE

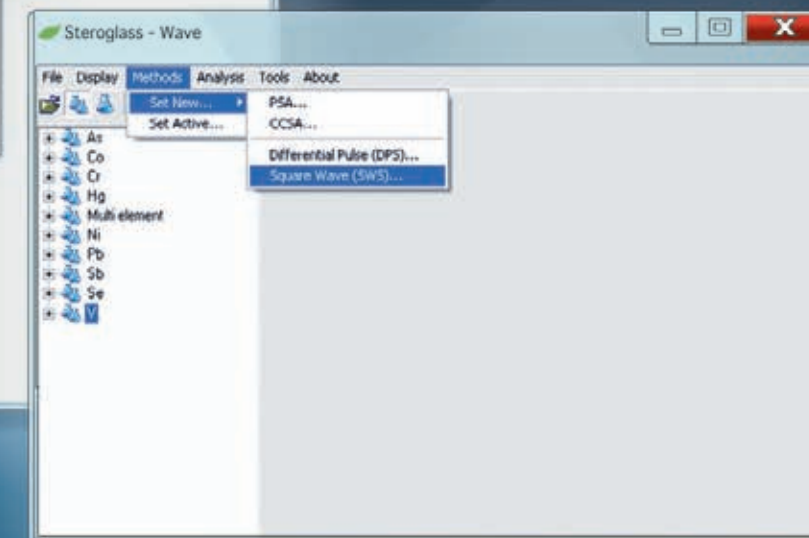
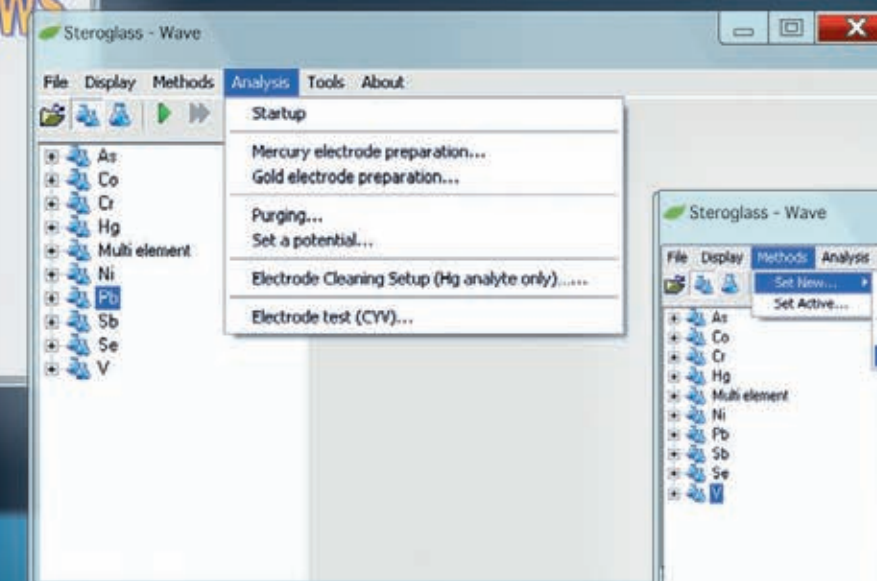
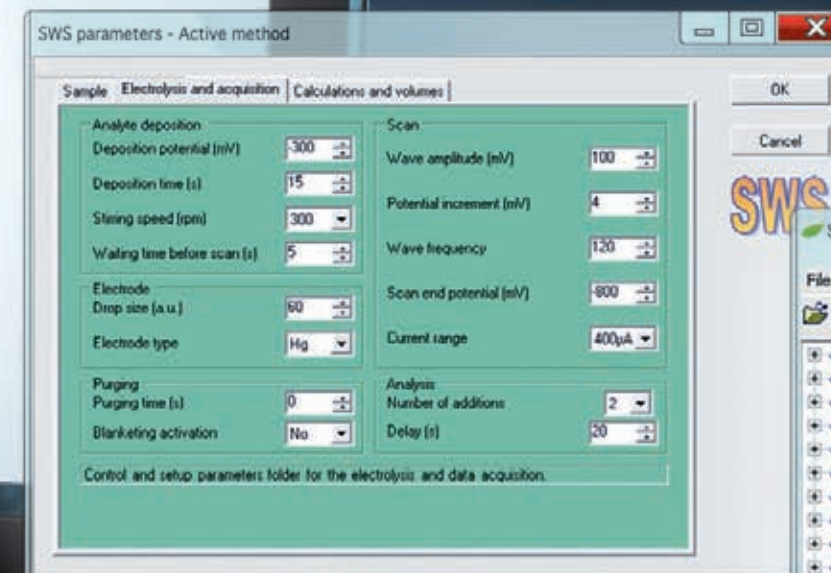
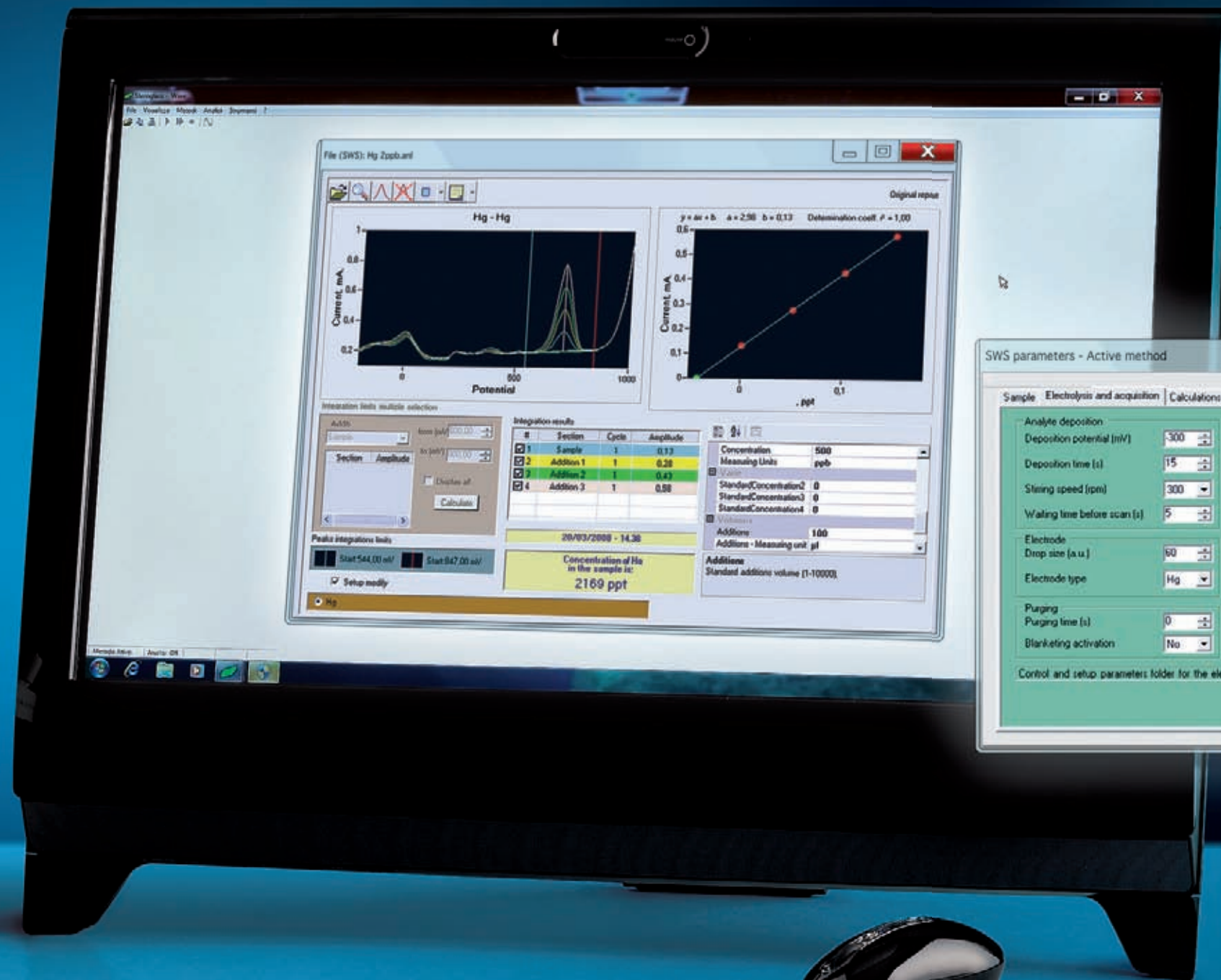
The hanging drop mercury electrode can be used for all analyses, mainly in the cathode field, when solid stationary or rotating electrodes cannot be used (GC , Au, GC with various types of films, etc.).

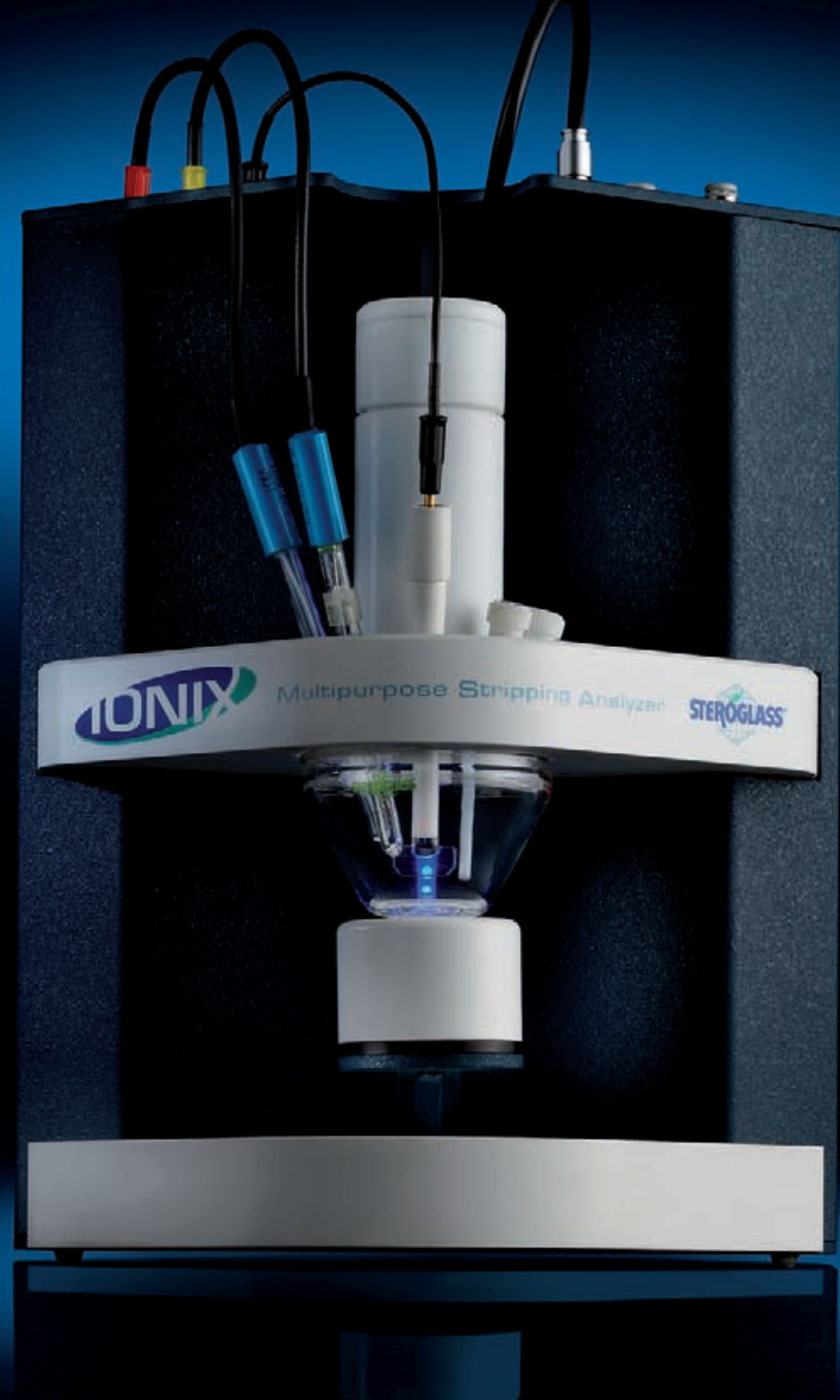
RDE use is also recommended as an alternative to solid electrodes, when a greater reproducibility is needed or when the memory effect of the solid electrodes is particularly disturbing.

The use of mercury drop electrode is also essential for analyses of organic compounds (polarographically active), where complexant agents are used and when there is risk of gas development at the electrode surface during the analysis.

HDME is also used for analyses of mineralized samples as the solution obtained from digestions by wet process (heat, microwave or high pressure) is aggressive and frequently destroys the Hg film formed on the carbographite.

- Easy parameters setup
- Automatic electrode setup by potential rate
- Electrode control by Cyclic Voltammetry
- User friendly





TECHNICAL SPECIFICATIONS

GENERAL SPECIFICATIONS	
Power supply	115-230 Vac +/-10% 50/60 Hz 35VA
Dimensions (WxLxH)	200 x 230 x 350 mm
Weight	8.5 kg

MINIMUM PC REQUIREMENTS	
Processor	Pentium® III
System memory	1Gb RAM (52Gb recommended)
Hard disk free space	100 Mb
CD-ROM unit	YES
Serial port	Nº2 serial ports (RS232 or USB)
Monitor	VGA monitor (1280x1024) or more
Printer	Any Windows™ compatible printer
Operating system	Microsoft® Windows™ XP

ELECTRICAL SPECIFICATIONS	
Output voltage	±12V
Response time	<100µs
Output impedance	>100MΩ
Current ranges	+/-2mA, fino a +/-2uA
Resolution	16 bit
Input voltage range	±10V
Input impedance	±10 ¹² Ω
Input leakage current	<10pA
Input noise	<25µVpp

ANALOG-DIGITAL CONVERSION	
Potential range	±4096 mV
Resolution	16 bit (±125 µV)
Conversion speed	>100 K sample/s

COMMUNICATION	
Interface	Serial opto-isolated RS 232 C and opto-isolated USB

ELECTROCHEMICAL MATERIALS AND DEVICES	
Electrodes support material	ARNITE®
Sample cell material	Borosilicate glass
Stirrers	Magnetic/with borosilicate glass helix Software controlled speed
Helix	Borosilicate glass
Purging system	Two-way automatic gas bubbler system

ELECTRODES	
Type	6 mm glass body with standard N6 conical joint
Reference Electrode	Ag - AgCl
Counter Electrode	Metal platinum (tip)
Working Electrode	3mm Glassy carbon disk (GC V-10 grade)
Optional working electrodes	Gold tip, GC tip for RDE, Au tip for RDE, Hanging drop Hg (HDME)



IONIX 98/230 Vac 50/60 Hz	
Wave software, N° 3 electrodes (Glassy carbon, Platinum, Silver Chloride) with stirrer	SQOJ061450

CONFIGURATION WITH RDE ELECTRODE

IONIX 98/230 Vac 50/60 Hz	
Wave software, N° 3 electrodes (Glassy carbon, Platinum, Silver Chloride) with stirrer	SQOJ061450
Rotating electrode with RDE controller, power supply and standard Au tip	SQOF057692
RDE electrode support (optional)	SQON061449

CONFIGURATION WITH HDME ELECTRODE

IONIX 98/230 Vac 50/60 Hz	
Wave software, N° 3 electrodes (Glassy carbon, Platinum, Silver Chloride) with stirrer	SQOJ061450
HDME hanging drop mercury electrode with N°3 0,1mm capillaries	SQOF062716
Accessories needed for HDME:	
100g Tri-distillate mercury	CLPE062782
250ml becker (2 pieces needed)	IFTU036264
IONIX vacuum pump (optional)	SQON065484

CONFIGURATION WITH RDE AND HDME ELECTRODES

IONIX 98/230 Vac 50/60 Hz	
Wave software, N° 3 electrodes (Glassy carbon, Platinum, Silver Chloride) with stirrer	SQOJ061450
Rotating electrode with RDE controller, power supply and standard Au tip	SQOF057692
RDE electrode support (optional)	SQON061449
HDME hanging drop mercury electrode with N°3 0,1mm capillaries	SQOF062716
Accessories needed for HDME:	
100g Tri-distillate mercury	CLPE062782
250ml becker (2 pieces needed)	IFTU036264
IONIX vacuum pump (optional)	SQON065484

ACCESSORIES AND STANDARD SPARE PARTS

20-200ul VARIABLE VOLUME PIPETTE	PKJY062959
100-1000ul VARIABLE VOLUME PIPETTE	PKJY062960
200ul TIPS 1000 pieces BULK	NPOW061738
1250ul TIPS 1000 pieces BULK	NPOW065195
RDE ELECTRODE SUPPORT	
or stationary electrode support if HDME is present	SQON061449
Disposable sample plastic cell (200 pieces)	SQOU006797
Borosilicate sample glass cell	SQOU006798
100ml standard plating solution	SQPG012481
0.05M 100ml plating solution	SQPG012480
100ml electrode cleaning solution	SQPG021946
100ml saturated KCl solution	SQPG047093
Glassy graphite electrode	SQOU009252
Platinum electrode	SQOU009240
Reference Ag/AgCl electrode	SQOU009253
Benchtop cell holder	SQFW017534
0,1mm glass capillary	SQOU063319
Standard RDE GC tip	SQOP065478
Standard RDE Au tip	SQOF057690
Stirrer without glass blade	SQOP061448
Borosilicate glass helix for stirrer	SQOU009317
6x20mm magnetic stirring bar	KAMY003871
Vacuum pump	SQON065484
100 ml Au plating solution	SQPG012464



HOW TO ORDER



COMPANY WITH
QUALITY SYSTEM
CERTIFIED BY DNV
= ISO 9001 =

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IONIX

Multipurpose System

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